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EXAMINER

RAO, SHRINIVAS H

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 05/31/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/440,928

Applicant(s)

AOKI ET AL.

Examiner

Steven H. Rao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 February 2002 and 07 March 2002.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 12-14, 22 and 24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11, 15-21, 23 and 25-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### **Response to Amendment**

Applicants' amendment filed Feb. 26, 2002 has been entered on March 19, 2002 and the supplemental amendment filed on March 07, 2002 has been entered on March 19, 2002.

Therefore claims 1, 4-6, 10,11, 15 -23 and 25-28 as amended by the supplemental amendment and presently newly added claims 29-31 are currently pending in the application.

### **Claim Rejections - 35 USC § 103**

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being obvious over Burghartz ( U.S. Patent No. 5,583,059, herein after Burghartz) previously applied.

With respect to claims 1 and 4, Burghartz in addition to the teachings recited in the previous office action, teaches the following :

amended claim I has the following new limitations : a pair of main electrodes used a s source and drain electrodes ( Burghartz fig. 1, nFET # 8a s/d, col. 3 line 59), an insulating gate film adjacent to the pair of main electrodes. ( Fig. 1 # 16, col. 3 , line 58) and a gate electrode comprising a first region composed of at least a first group IV element and a second group Iv element and formed in contact with the insulating gate film and a second region composed of the first group IV element and formed on the first region. ( Burghartz 2 A # 7, col. 3 line 37 and fig. 2A # 4-5 col. 4line 67).

It is noted that Burghartz describes a bipolar transistor formation in some figs. ( e.g. 2) and at col. 6 lines 30-35 it shows how the above description can be extended to BICMOS technology.

Claims 2 and 3 have been amended to recite the claim in correct English language by changing the "semi conductor integrated circuit" to a " semiconductor device" and changing IV group to IV group" and "insulated" to "insulating". semiconductor device ( Burghartz col. 1 lines 9-10) and these changes do not vary the scope of the previous claims.

B. Claims 5-11 and 15-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burghartz ( U.S. Patent No. 5,583,059, herein after Burghartz) as applied to claims 1-4 above, and further in view of Herbots et al. ( U.S. Patent No. 5,241,214, herein after Herbots) both previously applied..

Claims 5-10 the amendment only makes changes to "IV group" to "group IV" and " semiconductor integrated circuit " to " semiconductor device" and these changes do not vary the scope of the previous claims. ( see above teachings under claims 2-3 ).

With respect to claim 11, Burghartz and Herbots in addition to the teachings recited in the previous office action amended claim 11 has the following new limitations : a pair of main electrodes used as source and drain electrodes ( Burghartz fig. 1, nfet # 8a s/d, col. 3 line 59), an insulating gate film adjacent to the pair of main electrodes. ( Fig. 1 # 16, col. 3 , line 58) and a gate electrode comprising a first region composed of at least a first group IV element and a second group IV element and formed in contact

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with the insulating gate film and a second region composed of the first group IV element and formed on the first region. ( Burghartz 2 A # 7, col. 3 line 37 and fig. 2A # 4-5 col. 4line 67).

With respect to claim 15, Burghartz and Herbots in addition to the teachings recited in the previous office action amended claim 15 has the following new limitations " semiconductor device instead of " semiconductor integrated circuit" "conductivity" instead of "conductive, " "having' instead of "including", "Group IV' instead of "IV Group" and these changes do not vary the scope of the previous claims. ( see above teachings under claims 2-3).

The limitation the epitaxial layer formed ion the semiconductor region first and second group IV elements are formed in contact with the semiconductor region ( Burghartz col. 4 line 55 and fig. 3a , col. 5 lines 1-10).

Claims 17-22 have the following new limitations " semiconductor device instead of " semiconductor integrated circuit" "conductivity" instead of "conductive, " "having' instead of "including", "Group IV' instead of "IV Group" and these changes do not vary the scope of the previous claims ( see above teachings under claims 2-3).

With respect to claim 23, has the following new limitations " semiconductor device" instead of " semiconductor integrated circuit" "having' instead of "including", "Group IV " instead of "IV Group" and these changes do not vary the scope of the previous claims ( see above teachings under claims 2-3).

Further , for the limitation, an insulated field effect transistor having a pair of main electrodes used as source and drain electrodes, an insulating film adjacent to the pair of

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main electrodes and a gate electrode comprising (Burghartz fig. 1, nFET # 8a s/d, col. 3 line 59 and Fig. 1 # 16, col. 3 , line 58) and a gate electrode comprising a first region composed of at least a first group IV element and a second group IV element and formed in contact with the insulating gate film and a second region composed of the first group IV element and formed on the first region. ( Burghartz 2 A # 7, col. 3 line 37 and fig. 2A # 4-5 col. 4line 67).

A respective elevated electrode formed on the main electrodes. ( Burghartz col. 4 line 55 and fig. 3a , col. 5 lines 1-10).

Claims 25-27, have the following new limitations " semiconductor device" instead of " semiconductor integrated circuit", "Group IV" instead of "IV Group", and "insulating" instead of "insulated" and these changes do not vary the scope of the previous claims ( see above teachings under claims 2-3).

With respect to claim 28, it repeats the elements of claims 15 and 23 and see the teachings above.

With respect to claims 29-31, wherein the thickness of the layer is 1 nm or less. ( Herbots col. 4 lines 61-63).

Therefore all pending claims are rejected.

### **Response to Arguments**

Applicant's arguments filed 3/19/02 have been fully considered but they are not persuasive. Applicants' arguments that Burghartz describes a bipolar transistor only is not persuasive because Burghartz in fig. 1 and at least col. 6 lines 31nad 56-60 describes extending the foregoing description to BiCMOS.

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Herbots has several devices described and in figs. 2 to 11 describes other structures that have layers in the sequence/order that is similar to Burghartz.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H. Rao whose telephone number is (703) 3065945. The examiner can normally be reached on 8.00 to 5.00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaudhuri Olik can be reached on (703)3062794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 7463926 for regular communications and (703) 872-9319 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 3067722.

A handwritten signature in black ink, appearing to be "SL" with a horizontal line extending to the right.

May 31, 2002

A handwritten signature in black ink, appearing to be "Olik Chaudhuri" in a cursive style.

OLIK CHAUDHURI  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800